

PRESS RELEASE

For Immediate Release

GRANDIS WINS NEW DARPA CONTRACT TO DEVELOP NON-VOLATILE SPIN LOGIC

MILPITAS, Calif., Nov. 18, 2010 — Grandis, Inc., the leader in spin transfer torque random access memory (STT-RAM), today announced that it has been awarded a new contract from the Defense Advanced Research Projects Agency (DARPA) to develop non-volatile spin logic. Under the contract, the company will expand its cutting-edge development of spintronics and advanced magnetic materials beyond non-volatile STT-RAM memory into non-volatile logic applications. Non-volatile spin logic is a next-generation, solid-state logic technology that, in addition to being non-volatile, ultra-fast and radiation-hard, promises radically lower power consumption than conventional CMOS logic.

The program will be carried out through a collaboration between the University of Notre Dame and Grandis. Development work will focus on integrating magnetic tunnel junction (MTJ) materials capable of sensing very small magnetic fields with nano-magnets performing logic operations. The goal is to demonstrate non-volatile spin logic circuits operating at ultra-fast speeds of less than 1 nanosecond and ultra-low power consumption of less than 10 atto-Joules per operation. Such performance coupled with the inherent non-volatility of spin logic devices will enable not just significant reductions in the active power consumption of microprocessors but also the virtual elimination of standby power consumption.

“Non-volatile spin logic will solve the power density dissipation problem of CMOS based microprocessors, and create a greener world”, stated Mohamad Krounbi, senior vice president and general manager of research and development at Grandis. “We are proud to be a part of this DARPA program, a result of our clear leadership position in the field of spintronics. Non-volatile STT-RAM memory is close to commercialization, and we see non-volatile spin logic as the logical next step in our research and development roadmap.”

Grandis’ mission is to enable revolutionary products through application of the electron’s spin or magnetic moment. In conventional electronics, the *charge* of electrons is used to store (in capacitors), manipulate (in transistors) and transmit (in wires) information. Electrons can be

effectively controlled through their charge since voltages and currents are well understood. But in addition to charge, electrons possess an additional property, *spin*. While the charge of an electron determines how it behaves in an electric field, the spin of an electron determines how it behaves in a magnetic field: "spin up" electrons have magnetic moments that align with a magnetic field, while "spin down" electrons have magnetic moments that align in the opposite direction to a magnetic field. Spintronics, or spin electronics, refers to the exciting and rapidly evolving field in which both the charge *and* spin of electrons are used to process and store information. The vision for non-volatile spin logic is to combine both storage (spin memory or STT-RAM) and gain (spin transistors) in a single device. Such a device would have very high performance and very low power consumption, and enable continued scaling beyond the limits of conventional CMOS technology. Non-volatile spin logic thus has the potential to revolutionize the performance of electronic devices in many areas and give rise to entirely new products and applications not yet envisaged.

About Grandis, Inc.

Grandis is the leader in the development of spin-transfer torque RAM (STT-RAM), also known as STT-MRAM or SpinRAM, a non-volatile and scalable random access memory solution. Grandis licenses its technology to companies that are developing a variety of products incorporating stand-alone and embedded STT-RAM memory. It offers its licensees a complete range of support services from process installation through qualification. By combining non-volatility and high performance with low-power consumption and low cost, STT-RAM can revolutionize the performance of electronic products in many areas. Grandis was established in 2002, and is headquartered in Silicon Valley, California. Investors include Matrix Partners, Sevin Rosen Funds, Applied Ventures LLC, Incubic and Concept Ventures. Additional information about the company is available on the Internet at www.grandisinc.com.

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